

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of : **ATTN: BOX MISSING PARTS**

Seigo MURAKAMI et al. : Docket No. 2001-1478A

Serial No. 09/964,661 : **Confirmation No. 3534**

Filed September 28, 2001 :

CLEANING MEMBER, CYLINDRICAL
CLEANING ELEMENT OF CLEANING
MEMBER, METHODS FOR PRODUCING
CLEANING MEMBER AND CYLINDRICAL
CLEANING ELEMENT, AND TOOL FOR
ENLARGING DIAMETER OF CYLINDRICAL
CLEANING ELEMENT



PRELIMINARY AMENDMENT

Assistant Commissioner for Patents,
Washington, D.C.

Sir:

Prior to examination of the above-referenced U.S. patent application, kindly amend the application as follows:

IN THE CLAIMS

Please amend the claims as follows:

1. (Amended) A cylindrical cleaning element having an axial through-hole formed therein, so as to hold a rotary shaft in the through-hole with a press-fit, the cylindrical cleaning element being capable of being in either a wet state or a dry state, wherein the through-hole of the cylindrical cleaning element in a wet state has a diameter smaller than a shaft diameter of the rotary shaft and capable of being enlarged, and the cylindrical cleaning element in a dry state is capable of being set in a form such that the through-hole is enlarged.

3. (Amended) The cylindrical cleaning element according to claim 1, in which said cylindrical cleaning element is made in the dry state with said through-hole enlarged and, before being made in said dry state, said cylindrical cleaning element is subjected to said wet state to enable the through-hole to be enlarged and is purified in said wet state.

4. (Amended) A cleaning member comprising:
a cylindrical cleaning element having an axial through-hole formed therein; and
a rotary shaft held in the through-hole with a press-fit,
the cylindrical cleaning element being capable of being in either a wet state or a dry state, wherein the through-hole of the cylindrical cleaning element in a wet state has a diameter smaller than a shaft diameter of the rotary shaft and capable of being enlarged, and the cylindrical cleaning element in a dry state is capable of being set in a form such that the through-hole is enlarged, and wherein the press-fit of the rotary shaft in the through-hole of the cylindrical cleaning element is performed when the cylindrical cleaning element is in a wet state.

6. (Amended) The cleaning member according to claim 4, wherein a surface of the rotary shaft is formed so as to include raised and recessed portions for preventing a sliding motion.

7. (Amended) The cleaning member according to claim 4, wherein the cylindrical cleaning element is made in the dry state with said through-hole enlarged and, before being made in said dry state, said cylindrical cleaning element is subjected to the wet state to enable the through-hole to be enlarged and is purified in said wet state.

9. (Amended) A method for producing a cylindrical cleaning element, comprising:
preparing a cylindrical cleaning element having an axial through-hole formed therein for passing a rotary shaft, the cylindrical cleaning element being capable of being in either a wet state

or a dry state and the through-hole having, in a wet state, a predetermined diameter smaller than a diameter of the rotary shaft;

wetting the cylindrical cleaning element;

enlarging the through-hole of the wet cylindrical cleaning element so that it has a diameter larger than the diameter of the rotary shaft; and

dry-setting the enlarged cylindrical cleaning element.

10. (Amended) A method for producing a cylindrical cleaning element according to claim 9, wherein the cylindrical cleaning element is purified in said wet state.

13. (Amended) A tool for enlarging a diameter of a cylindrical cleaning element used in a method for forming a cleaning member, in which a cylindrical cleaning element having an axial through-hole formed therein and having a predetermined inner diameter in a wet state is caused to be wet and the through-hole of the wet cylindrical cleaning element is enlarged, the cylindrical cleaning element is dry-set in a form such that the through-hole is enlarged, a rotary shaft is inserted into the through-hole of the dry-set cylindrical cleaning element, the rotary shaft having an outer diameter smaller than a diameter of the enlarged through-hole and larger than the predetermined inner diameter of the through-hole, and the dry-set cylindrical cleaning element after insertion of the rotary shaft is caused to be wet, to thereby provide a press-fit between the cylindrical cleaning element and the rotary shaft to form said cleaning member,

the tool being adapted to be used for enlarging an inner diameter of the wet cylindrical cleaning element in the method and comprising:

a cylindrical segmented core rod having an axial through-hole formed therein and capable of being diametrically enlarged or contracted, the segmented core rod being adapted to be inserted in a contracted state into the through-hole of the wet cylindrical cleaning element; and

a diameter-enlarging element adapted to be inserted into the through-hole of the segmented core rod which has been inserted into the through-hole of the cylindrical cleaning

element, so as to enlarge a diameter of the segmented core rod to a diameter larger than the outer diameter of the rotary shaft.

REMARKS

The above amendments have been made to make minor editorial changes so as to generally improve the form and scope of the claims.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current Amendment. The attached page is captioned "Version With Markings to Show Changes Made".

Respectfully submitted,

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WHAT IS CLAIMED IS:

1. A cylindrical cleaning element having an axial through-hole formed therein, so as to hold a rotary shaft in the through-hole with a press-fit, the cylindrical cleaning element being capable of being in either a wet state or a dry state, wherein ~~when the cylindrical cleaning element is separated from the rotary shaft, the through-~~ hole of the cylindrical cleaning element in a wet state has a diameter smaller than a shaft diameter of the rotary shaft and capable of being enlarged, and the cylindrical cleaning element in a dry state is capable of being set in a form such that the through-hole is enlarged.
2. The cylindrical cleaning element according to claim 1, wherein the cylindrical cleaning element is made of sponge comprising polyvinyl acetal or polyvinyl formal.
3. The cylindrical cleaning element according to claim 1, ~~in which~~ in which said cylindrical cleaning element is made in the dry state with said through-hole enlarged and, before being made caused to be in said dry state, said cylindrical cleaning element is subjected to said in a wet state before being in the dry state, to enable the through-hole to be enlarged and is purified in said ~~the~~ wet state.
4. A cleaning member comprising:
a cylindrical cleaning element having an axial through-hole formed therein; and
a rotary shaft held in the through-hole with a press-fit,
the cylindrical cleaning element being capable of

being in either a wet state or a dry state, wherein ~~when the cylindrical cleaning element is separated from the rotary shaft,~~ the through-hole of the cylindrical cleaning element in a wet state has a diameter smaller than a shaft diameter of the rotary shaft and capable of being enlarged, and the cylindrical cleaning element in a dry state is capable of being set in a form such that the through-hole is enlarged, and wherein the press-fit of the rotary shaft in the through-hole of the cylindrical cleaning element is performed when the cylindrical cleaning element is in a wet state.

5. The cleaning member according to claim 4, wherein each of the rotary shaft and the through-hole has a circular cross-section.

6. The cleaning member according to claim 4, wherein a surface of the rotary shaft is formed so as to include raised and recessed portions for preventing a sliding motion.

7. The cleaning member according to claim 4, wherein the cylindrical cleaning element is made in the dry state with said through-hole enlarged and, before being made in said dry state, said cylindrical cleaning element is subjected to the wet state to enable the through-hole to be enlarged and is purified in said wet state.~~is caused to be in a wet state before being in a dry state, and purified in the wet state.~~

8. The cleaning member according to claim 4, wherein the cylindrical cleaning element is made of sponge comprising

polyvinyl acetal or polyvinyl formal.

9. A method for producing a cylindrical cleaning element, comprising:

preparing a cylindrical cleaning element having an axial through-hole formed therein for passing ~~at the~~ rotary shaft, the cylindrical cleaning element being capable of being in either a wet state or a dry state and the through-hole having, in a wet state, a predetermined diameter smaller than a diameter of the rotary shaft;

wetting the cylindrical cleaning element;

enlarging the through-hole of the wet cylindrical cleaning element so that it has a diameter larger than the diameter of the rotary shaft; and

dry-setting the enlarged cylindrical cleaning element.

10. A method for producing a cylindrical cleaning element according to claim 9, wherein the cylindrical cleaning element is purified in ~~said the~~ wet state.

11. A method for producing a cleaning member comprising a cylindrical cleaning element and a rotary shaft held therein with a press-fit, the method comprising:

preparing a rotary shaft and a cylindrical cleaning element, the rotary shaft having a predetermined diameter, the cylindrical cleaning element having an axial through-hole formed therein and being capable of being either in a wet state or a dry state, the through-hole having, in a wet state, a predetermined diameter smaller than the diameter of the rotary shaft;

wetting the cylindrical cleaning element;

enlarging the through-hole of the wet cylindrical cleaning element so that it has a diameter larger than the diameter of the rotary shaft;

dry-setting the enlarged cylindrical cleaning element;

inserting the rotary shaft into the through-hole of the dry-set cylindrical cleaning element; and

wetting the cylindrical cleaning element into which the rotary shaft has been inserted, to thereby contract the diameter of the through-hole of the cylindrical cleaning element and provide a press-fit between the cylindrical cleaning element and the rotary shaft.

12. The method according to claim 11, wherein a cylindrical cleaning element made of sponge comprising polyvinyl acetal or polyvinyl formal is prepared as the cylindrical cleaning element.

13. A tool for enlarging a diameter of a cylindrical cleaning element used in a method for forming a cleaning member, in which a cylindrical cleaning element having an axial through-hole formed therein and having a predetermined inner diameter in a wet state is caused to be wet and the through-hole of the wet cylindrical cleaning element is enlarged, the cylindrical cleaning element is dry-set in a form such that the through-hole is enlarged, a rotary shaft is inserted into the through-hole of the dry-set cylindrical cleaning element, the rotary shaft having an outer diameter smaller than a diameter of the enlarged through-hole and larger than the predetermined inner

diameter of the through-hole, and the dry-set cylindrical cleaning element after insertion of the rotary shaft is caused to be wet, to thereby provide a press-fit between the cylindrical cleaning element and the rotary shaft to form saida cleaning member,

the tool being adapted to be used for enlarging an inner diameter of the wet cylindrical cleaning element in the method and comprising:

a cylindrical segmented core rod having an axial through-hole formed therein and capable of being diametrically enlarged or contracted, the segmented core rod being adapted to be inserted in a contracted state into the through-hole of the wet cylindrical cleaning element; and

a diameter-enlarging element adapted to be inserted into the through-hole of the segmented core rod which has been inserted into the through-hole of the cylindrical cleaning element, so as to enlarge a diameter of the segmented core rod to a diameter larger than the outer diameter of the rotary shaft.

14. The tool according to claim 13, wherein the segmented core rod has a generally circular cross-section and includes a plurality of slits arranged in a circumferential direction thereof in a predetermined spaced relationship and extending in an axial direction of the segmented core rod, and comprises a plurality of segments divided by the slits and extending in the axial direction.

15. The tool according to claim 14, wherein the through-

hole of the segmented core rod has a taper surface which is tapered from opposite ends thereof toward the center of the segmented core rod, and wherein the diameter-enlarging element comprises two elements inserted from the opposite ends of the through-hole of the segmented core rod, each of the elements being tapered from a base end to a distal end thereof in conformity to the taper surface of the through-hole and adapted to be inserted from an end portion of the through-hole of the segmented core rod to a predetermined depth into the through-hole, to thereby enlarge the diameter of the segmented core rod to the diameter larger than the diameter of the rotary shaft.